

WHAT IS CLAIMED IS:

1. An adjustable positioning mechanism for positioning an optical element relatively to a second element, said mechanism comprising:
 - a reference plate having a predetermined shaped socket providing a reference mating surface;
 - a mobile member for holding said optical element, said mobile member having a shaped mating portion at least part of which is defined by a spherical surface adapted for fitting into said shaped socket of said reference plate and abutting against said reference mating surface, thereby providing a pivot type of joint between said reference plate and said mobile member;
 - a deformable maintaining element connected to said mobile member acting against said reference plate and adapted to rotatively hold said mobile member and said reference plate together in cooperation with said pivot type of joint;
 - a releasable non-deformable securing element connected to said mobile member frictionally acting against said reference plate for rigidly securing said mobile member and said reference plate together when said securing element is in a locked position; and
 - non-deformable tilt adjustment means connected to the mobile member and pressing against the reference plate, said tilt adjustment means providing a controlled angular movement of the mobile member relative to the reference plate when the securing element is in an unlocked position.
2. The adjustable positioning mechanism according to claim 1, wherein said reference mating surface comprises a spherical supporting portion.
3. The adjustable positioning mechanism according to claim 1, wherein said shaped socket of said reference plate is a cylindrical socket diametrically smaller than said spherical surface of said mobile member.

4. The adjustable positioning mechanism according to claim 1, wherein said shaped socket of said reference plate is an opening, the mobile member extending through said reference plate.
5. The adjustable positioning mechanism according to claim 4, wherein said mobile member has a longitudinal opening for transmitting light therethrough.
6. The adjustable positioning mechanism according to claim 4, wherein said reference plate has a first side and a second side opposed thereto, said mating surface of said reference plate extending on said first side while said maintaining element, said securing element and said tilt adjustment means extend on said second side.
7. The adjustable positioning mechanism according to claim 1, wherein said optical element has an optical axis co-incident with a center of rotation of said pivot type of joint.
8. The adjustable positioning mechanism according to claim 1, wherein said optical element has a focal point co-incident with a center of rotation of said pivot type of joint.
9. The adjustable positioning mechanism according to claim 1, wherein said securing element comprises a body of a spring loaded plunger set screw pressing against the reference plate in said locked position, said maintaining element comprising a spring operated friction element of said spring loaded plunger set screw pressing against said reference plate in said unlocked position.
10. The adjustable positioning mechanism according to claim 9, wherein said spring operated friction element slidably acts against said reference plate in a shaped groove extending therein adapted for confining a rotation of said mobile member.

11. The adjustable positioning mechanism according to claim 10, wherein said spring operated friction element is a ball, said groove being V-shaped and adapted for preventing said mobile member from rotating in a plan defined by a main surface of said reference plate.
12. The adjustable positioning mechanism according to claim 10, wherein said spring operated friction element is cylindrically shaped and longitudinally extends in said groove having a cylindrical shape for confining said rotation of said mobile member to a single rotation.
13. The adjustable positioning mechanism according to claim 1, wherein said tilt adjustment means comprise a first and a second adjustment set screw extending through threaded holes of the mobile member and acting ninety-degrees spaced apart against said reference plate, thereby allowing a first and a second independently tuned tilt angle adjustment.
14. The adjustable positioning mechanism according to claim 1, further comprising sealing means for hermetically sealing said reference plate and said mobile member together when said securing element is in said locked position.
15. The adjustable positioning mechanism according to claim 14, wherein said securing element and said maintaining element are removable.
16. The adjustable positioning mechanism according to claim 14, wherein said tilt adjustment means are removable.
17. The adjustable positioning mechanism according to claim 14, wherein said sealing means comprise an epoxy bonding.

18. The adjustable positioning mechanism according to claim 14, wherein said sealing means comprise a welding.

19. The adjustable positioning mechanism according to claim 14, wherein said sealing means comprise a reflow soldering.

20. The adjustable positioning mechanism according to claim 1, wherein said reference plate is slotted down to the socket for allowing a mounting of the mobile member with the reference plate.

21. The adjustable positioning mechanism according to claim 1, wherein said reference plate comprises a first and a second part assembled around the mating portion of said mobile member.

22. The adjustable positioning mechanism according to claim 1, wherein said mobile member comprises a central element and an outer ring removably fixed to the central element, said maintaining element, said securing element and said tilt adjustment means being connected to the outer ring.